

STUDY ON AMALGAMATION OF INTERNET OF THINGS IN INDUSTRIAL APPLICATIONS

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ABSTRACT

Internet of things is a new concept that shows the power of what connected devices can do in day-to-day lives. Millions of people in some way, shape or form, are contributing towards an internet society and an internet economy by having and using devices that are connected to the internet and to each other. IoT has great potential to support society, to improve energy efficiency and to optimize various kinds of mobility and transport. On the other hand, IoT elevates the significant challenges to ensure through recognizing its probable merits. Issues regarding cyber security, theft and hacking of personal and financial data are the primary concerns among a majority of public and organizations. A simple mobile phone can connect to other devices to sensors in public to regulate traffic and other civic institutions, the necessary data is merged with IoT and also the concern data analysis will engage in recreation as key role to continue in future. In this study, the integration of IoT in various industrial applications is studied.

KEYWORDS: IoT, Industrial Application, Mobility, Cyber Security & Business

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INTRODUCTION

Systems, applications and products (SAP) research defined the IoT as ‘a world where physical objects are seamlessly integrated into the information network, and where the physical objects can become active participants in business processes’ [1-5]. As broadband internet is more widely available, the cost of connecting is decreasing, more devices are being created with Wireless fidelity (Wi-Fi) capabilities and sensors built into them [6-10]. The cost of technology is going down and smart phone usage is increasing at a fast rate. The youth development leads to mounting in cloud computing to manage and store data, progression of data analytics with new algorithms for extracting necessary information’s [11-14]. A number of companies and research organizations have offered a wide range of projections about the potential impact of IoT on the internet and the economy during the next five to ten years. Cisco projects estimated that by 2020, there could be 50 billion devices that can connect to the internet.

Applications

The underlying concept behind it is far from a new concept. The growth in mobile devices and the broad availability of wireless connectivity is now driving IoT to the forefront [15-18]. Some of the simple ways in which IoT can create value are as follows.

- **Humans** - Devices that are worn by people to monitor and maintain health and wellness and help in increasing fitness etc.
- **Retail** - Places where consumers engage in commerce. Chain stores, restaurants etc where consumers purchase goods or use a service through self-checkout and where targeted offers are made to consumers.
- **Factories** - Places where there are repetitive work routines, including hospitals and farms. IoT helps in operating efficiencies, optimizing equipment use and inventory.
- **Vehicles** - Cars, bikes and other modes of transportation such as trucks, ships, aircraft, and trains where there sensors and systems inside.
- **Cities** - Large urban environments and public spaces where IoT is used for adaptive traffic control and environmental monitoring.

The IoT is being applied and used all the way through homes, businesses, hospitals, modes of transportations and entire cities. Taking two of the most commonly used applications of home and office are discussed.

Home

Home is a very common place where everyday consumers see Internet-connected devices. From lights to smart outlets and key tracking devices, they help owners save time and money. Remotely monitoring and controlling devices which are on and off at any certain time helps homeowners reduce monthly electric, gas and water bills. A connected or smart phone is beginning to come together. The key word here is beginning as many consumers still do not understand connected device value propositions and early adopters face significant pain points that have yet to be addressed.

At home, the emphasis is on ease of use and to help people lead more comfortable lives. Smart homes filled with connected products are loaded with possibilities to make our lives easier, more convenient and more comfortable. For example, Alexa, the voice assistant on the Amazon Echo, where one can ask Alexa to either read that days' news or if while cooking can read you a specific recipe. This device is simple but powerful as they are connected to the world wide web.

Office/Workplace

The IoT is likely to change office life in fairly small ways. One of the more straightforward applications for IoT technology in the office is to improve the way people connect with their work space and with each other. They focus on providing employees with up-to-the-minute information about their surroundings by answering questions such as where is the nearest quiet zone like is the dish of the day still available at the office café?, and is my favorite workstation free?. The IoT won't just empower things and it will also empower people to better manage aspects of their work lives. The president of technology firm visage mobile stated that this trend is underway with the introduction of fingerprint scanning on the new iPhone, cars equipped to synchronize with devices and other location-based mobile services. He states that 'I'm imagining I walk out of my front door with my device. My device locks the door behind me. It starts my car. It pays for my coffee at Starbucks. It knows that when I get in my car and I say I'm going to Starbucks, it has my order waiting for me when I get there. It recognizes that I'm late for a meeting and changes my meeting because it knows by my location'. Machine to Machine (M2M) technology will likely transform the future of meetings physically and virtually. Employees may also turn to wearable technology to further increase collaboration and efficiency. There are four key points

to look at with regards to a smart office as follows.

Collective Intelligence

Connecting people across a company enhances accuracy and productivity. Using the vast resources of a company to solve a problem becomes easy by being able to connect to the right person at the right time.

Connected Products

Connected products offers great insight. An example here is Disneyland where they have replaced traditional tickets with magic bands. In the past, if a product broke down it would be the first sign of trouble. With a smart device each component is monitored and alert technicians.

Connected Environments

Some devices like Philips's hue light bulbs and Google's Nest thermostat turn a smart office into an intelligent ecosystem.

Business Intelligence

Every company has large amount of data collected and stored and smart workplace also helps make sense of this metadata.

Major Cities

The IoT is largely applied to homes, offices, workspaces and factories where its aim is to help make everyday life easier and more streamlined. However, an important being asked is how IoT can be used on a much larger scale, for an entire town or a large sprawling metropolis with a population of millions. Many governments have adopted the use of information and communication technology (ICT) in urban planning through the concept of smart cities. The aim of a smart city is to make a better use of the public resources, increasing the quality of the services offered to the citizens, while reducing the operational costs of the public administrations. The possibility of using IoT in a large urban context is high. This can be done by communication infrastructure that provides unified, simple and economical access to public services. An urban IoT brings a number of benefits in the management and optimization of traditional public services, such as transport, parking, lighting, surveillance, maintenance of public areas, preservation of cultural heritage and garbage collection [19-23]. Another benefit could be through the availability of different types of data, there can be way to increase the transparency and promote the actions of the local government toward the citizens, enhance the awareness of people about the status of their city, encourage citizens to participate in the management of public administration and perhaps creation of new services. A main aspect of an urban IoT smart city is integrating different technologies with the existing communication infrastructures. A fundamental part of this the need to make the data collected by the urban IoT easily accessible by authorities and citizens to increase the responsiveness of authorities to city problems and to promote the awareness and the participation of citizens in public matters.

Opportunities

There is a lot of potential to be tapped into with regards to the IoT like B2B value, operations and new business models are discussed below.

B2B Value

In another decade B2B IoT services will generate about 70% of business application to cover the consumer needs and smart homes automated products.

Operations

Through invest in IoT hardware the new business value will be created by optimizing the operations in manufacturing industries to provide a flow of data for optimizing the workflow and operation process with more effectiveness.

New Business Models

The largest and most sophisticated corporations struggle to make the most of information technology. Investing in IoT is both strategic and operational for a company. It gives the ability to capture, analyze and act on the data that can be collected. This requires not only sophisticated technology, but also an organization that can share data and management that is ready to make data-driven decisions. A company will need to learn how to interpret real-time data and will need to share their data.

Challenges

With all benefits of it, there is also considerable risk involved as the increase in connecting devices gives hackers and cyber criminals more entry points. Aside from the security issues, there is the need for privacy which an average consumer is concerned about. There are some challenges with regard to the IoT discussed as follows.

Aligning Organization

The adoption of IoT may force the company to modify traditional organizational roles to information technology becomes widely embedded across assets, inventories and operations. As a result, companies will have to align their IT and operational leadership.

Security Imperative

Implementing the IoT brings the issue of cyber security to the forefront. Owing to this, Mckinsey estimates that such technology could save \$380 billion per year for retailers around the world in 2025.

Inventory Management

Generally, inventory management plays a key role in retail and manufacturing industries to implement the appropriate data's. The overall cost of the business is to be saved by proper logistics and tracking of shipments. If the inventory management is in digital form, then it is easy to identify about the stock by the purchase department to keep the inventory without empty of popular items [24-28].

IoT and Big Data

The value of big data and IoT combined gives the power and reach of information. Big data is enabling organizations to collect and analyze data in new ways, helping to transform businesses, industry, government services and people's lives. Added to the capabilities of big data is the new power in the IoT. In order for the full potential of big data and the IoT to be realized, both technologies should be used together. The IoT provides a tool through which the most

interesting and relevant data can be collected. However, just collecting data is not enough. Big data analytics solutions offer insights into how this data can be interpreted, enabling makers in business and government alike. Just like big data IoT adds to the challenge for businesses of managing and making the most of such large amounts of information. It's important for a business to have the appropriate technology in place, it must also have the ability to share data and make data driven decisions. Big data combined with IoT offer the following channels through which businesses can benefit customer intelligence, supply chain management, quality management, risk management, performance management and detection of deception [29-34]. A company that reaps benefits from the integration of big data and IoT, businesses may be able to increase their salary budgets as more money can be spent on wages in light of improvements in both productivity and profitability. Big data and the IoT can also result in increased demand for employees in data-specific roles, for example software programmers and data analysts. This demand can be expected to continue to grow as businesses adopt more data-driven technologies and the IoT becomes increasingly prevalent across different industries.

FUTURE OF IoT

A 2015 report made the following recommendations for the future of IoT and big data.

- Technology providers should share best security practices and participate in the development of technology test-beds to demonstrate how solutions from different organizations can work together. Adopters of the Industrial Internet should develop multiple scenarios about alternative futures and map out the company's possible responses and identify processes and organizational structure required to achieve long-term success through data analytics and connected devices.
- Companies need to reorganize their overall business strategy to take full advantage of the latest developments in IoT and data management and partner with other platforms or develop their own. Operational safety and security practices vary greatly across industry domains. There should be common security framework for the Industrial Internet to understand and document existing best practices across industries. This will help identify gaps and requirements for potential innovation, standards or new cyber security products. This also ensures that a unified industry voice when communicating with governments or agencies involving security.
- Policy makers should re-examine and update their data protection and liability policies so that data flow is smoother. In emerging markets, governments need to increase investment in digital infrastructure like embedded sensors and broadband connectivity to take advantage of the potential and accelerate regional economic development. Companies worldwide need clear legal guidelines over data ownership, transfer and usage. Governments need to work with each other and industries to simplify data and liability laws.
- Some industries, such as utilities and healthcare are heavily regulated in many parts of the world. For these industries to benefit from the industrial internet, policy-makers will need to revisit and possibly relax existing regulations to provide more flexibility and incentives for companies to invest and innovate.
- The success of IoT and data depends heavily on the presence of robust infrastructures such as good broadband connectivity and sensors. Emerging markets have a unique opportunity to overtake developed countries in terms of IoT. This can be done through targeted investment.
- Industries, governments and academia need to collaborate on long-term research and development to solve

fundamental technology challenges related to security and risk management as well as implement new training programmes, and provide policy incentives to employers and workers to encourage prospective employers to learn new skills specific to the information technology sector for high-demand job categories.

CONCLUSIONS

The IoT is a key component of understanding customer behavior and can unlock potential revenue streams. Smart connections sensors and beacons will become vital for enterprises, especially when it is time to convert that data into actionable information. Based on the study the following conclusions were arrived.

- IoT has the potential to transform the way companies make products, track goods and assets in the supply chain, provide security for employees and facilities and provide services to customers. It is enabling transformation in both the private and public sectors.
- As more products become smart and connected, software is emerging as the connective tissue. The merging of the physical and digital worlds begins with sensors and sensory data. This is becoming the currency of the Industrial Internet economy, and the foundation for new software-enabled services.
- There are ongoing improvements in sensor technologies, including miniaturization, performance and cost and energy consumption which are making intelligent products more accessible. The workforce impact of digital technologies will be gradual and profound, as the industrial internet transforms industries and business practices.
- System-wide changes take time and planning, business and government leaders and planners will need to act now in preparing for the digital talent market. The IoT involves a complex and evolving set of technological, social and policy considerations across a diverse set of stakeholders.
- Public enthusiasm for the IoT has been muted to date, but enterprises can take advantage of the gap and use it to enhance their own digital capabilities. Provided that enterprises understand the ever-changing environment that the IoT generates, then it could be a perfect fit.

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